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PATENT  
0365-0444P

IN THE U.S. PATENT AND TRADEMARK OFFICE

APPLICANT: CROZIER, Herve et al. CONF: 3623  
SERIAL NO.: 09/530,803 GROUP: 1713  
FILED: 06/12/00 EXAMINER: LEE, Rip A  
FOR: COLOURED POLYPROPYLENE COMPOSITIONS

**DECLARATION SUBMITTED UNDER 37 C.F.R. § 1.132**

Honorable Commissioner  
Of Patents and Trademarks  
Washington, D.C. 20231

April 23, 2003

Sir:

I, Dr. Mika Härkönen of the Polyolefin Research and Technology, Borealis  
Polymers Oy, Finland, do hereby declare the following:

I have attached a copy of my curriculum vitae to this Declaration.

I am Research Manager, Catalysts and Polymerisation, and I am fully  
knowledgeable of the experiments conducted and described below.

I am familiar with the above referenced patent application, as well as the  
development, usages and properties of polymer compounds.

I have read and understand the subject matter of the Office Action of  
November 27, 2002.

The following comments are offered in support of the patentability of the  
instant invention.

The Watanabe reference is directed to a polymer composition having good rigidity, impact and heat resistance, and surface hardness. Watanabe achieves this by using a propylene block copolymer composition that has a specific composition of propylene homopolymer and copolymer. Nucleating agents are used in an amount of 0.05 – 30 wt-% (column 3, lines 1-2).

Watanabe makes no special selections for the type of nucleating agent used.

In column 10, lines 36-38, Watanabe teaches that additives such as coloring agents, can be added in an amount that does not impair the effect of the composition. Further along in column 10, lines 62-64, Watanabe teaches that additives can be added in an amount of 0.01-1 wt-%. This teaching of Watanabe suggests that additives, such as coloring agents, impair the properties of the polymer if amounts greater than 1 wt-% are used.

In our research, we have found that we can effect nucleation by modifying the polymerization catalyst with vinyl compounds and use this modified catalyst for the polymerization of propylene, which results in nucleation of the polymer. This is described on page 5, lines 19-23 of the application. The nucleated polymer that results can then be used alone or as a blend with non-nucleated polymer, as described on page 5, lines 23-25.

This kind of nucleation results in a propylene polymer with a crystallization temperature of more than 7°C higher than the corresponding non-nucleated propylene polymer. This high crystallization temperature of the polymer speaks to the very strong nucleation affect that our method achieves and which dominates the different nucleation effects of different pigments, preventing

dimensional variations when different pigments are used. This is explained in the application on pages 3, second paragraph, page 6, lines 11-20 and page 13, last paragraph. This has been further shown in the examples and comparative examples of the application. In the examples according to the invention the differences in the shrinkage between different colouring agents are very small, whereas those differences in the non-nucleated or talc-nucleated polymers are much bigger.

We have conducted additional experiments monitoring the effect of different amounts of colouring agents in the polypropylene composition of the invention. These examples show that in spite of different amounts of colouring agents, the dimensional variations are very small. That is, when the nucleation of propylene polymer is carried out by modifying the catalyst with a polymer containing vinyl compound units, higher amounts of pigments, i.e. up to 5 wt-% can be used without impairing the dimensional stability of the product. These experiments are summarized in the table below.

% Masterbatch	% Flow (red)	% Cross (red)
0.01	1.52	1.69
0.5	1.53	1.70
1	1.51	1.69
2	1.49	1.70
3	1.50	1.70
4	1.51	1.71
5	1.53	1.71

	% Flow (Blue)	% Cross (blue)
0.01	1.51	1.69
0.5	1.51	1.72
1	1.51	1.72
2	1.51	1.75
4	1.51	1.69
5	1.50	1.70

In the table above, % Masterbatch indicates the color agent (colouring pigment) designating the material giving to the final product a desired color. % Flow indicates the shrinkage % of the article in flow direction, and % Cross indicates the shrinkage of the article in cross direction, both % Flow and % Cross being calculated by comparing the dimension measured to the nominal mould dimension. The shrinkage was tested to heterophasic PP (modified catalyst) with different amounts of pigment (red and blue). From these results, it is clear that the stability of the red colouring agent was very good with shrinkage less than 5% for all amounts, even % Cross. While the blue colouring agent showed some higher shrinkage (only in % Cross) with some amounts, it, too, provided good stability and little shrinkage.

The undersigned hereby declares that all statements made herein based upon knowledge are true, and that all statements made based upon information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

DATED: 23.04.2003

  
Dr. Mika Härkönen

Enclosures: As stated above

**CURRICULUM VITAE**

23.4.2003

**Contact information**

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**Work experience**Current job:

Research Manager in Borealis Polymers Oy (Finland)

- 1.8.2002 -
- Catalysis and Polymerisation,
- Ziegler-Natta Catalyst Technology, PE and PP catalysts
- line responsibility of 12 persons and a catalyst synthesis and polymerisation laboratory.

Previous work experience in Borealis:

Research Manager in Borealis AS (Norway)

- 15.5.2001 - 30.7.2002,
- Catalysis and Polymerisation, and Polyethylene Research (1.1. - 30.7.2002)
- line responsibility of 13 persons and a polymerisation laboratory,
- functional responsibility on Chromium Catalyst Technology.

Senior Development Engineer in Borealis AS (Norway)

- 1.2.1998 - 15.5.2001
- Application Centre PP Moulding
- product development, product ownership, project management, and marketing and sales support within various polypropylene injection moulding market segments, including also Borstar PP products.

Development Engineer in Borealis Polymers Oy (Finland)

- 1.3.1995 - 31.1.1998,
- polypropylene pilot plant (PORE)
- planning, supervision and reporting for material, catalyst and process, development test runs
- project manager of process and material development projects
- responsible of coordination of patenting and patent follow-up of PP technologies,
- Lead Catalyst Engineer (high yield PP Z-N catalysts).

## Education and significant courses

Dr.Tech. (Chem. Eng.)

Helsinki University of Technology, 1995

Catalysis of polymerisation of propene: "External donors in stereospecific polymerisation of propene"

Nestman International 11, International Business Programme

- an internal course of Neste Corporation,
- 4 weeks in 1992-93.

Lic.Tech. (Chem. Eng.)

Helsinki University of Technology, 1991

Main subjects: Polymer technology, industrial chemistry, management of innovations and R&D juridic.

M.Sc. (Chem. Eng.),

Helsinki University of Technology, 1988

Main subjects: Polymer technology, industrial chemistry, plant design and industrial economics

## Publications

20 articles in scientific journals:

13 about polypropylene catalysis,

7 about biodegradable polymers,

15 scientific presentations in international conferences,

16 patent applications or patents,